

# National Bridge Inspection Standards & Bridge Maintenance Program Review Defiance County April 9, 2021

By: Mark Stockman, PE, PS  
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## IN ATTENDANCE:

Warren Schlatter, Defiance County Engineer  
Mark Stockman, CEAO Federal Bridge QA/QC Engineer  
Mark Sherman, CEAO Federal Bridge QA/QC Engineer

## SCOPE OF REVIEW:

The review consisted of interviews with Defiance County personnel, reviews of inspection and inventory data, and reviews of Defiance County bridge records. The office evaluation assessed Defiance County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of six bridges were conducted to determine if ratings were consistent with the ODOT Coding Manual and FHWA Recording and Coding Guide and to determine if inventory items were coded correctly. The bridges were selected by Defiance County to represent a variety of structure types and conditions. The bridges checked during the field review were:

<u>Asset Name</u>	<u>TYPE</u>	<u>County Rating</u>	<u>Suggested NBIS Rating</u>
DEF-T0042-0100 _(2042525)	Steel Culvert	4	same
DEF-C0150-0170 _(2040123)	Prestr. Box Beam	4	same
DEF-C0067-0150 _(2040271)	Steel Beam	5	same
DEF-C0058-1116 _(2043556)	Concrete Culvert	3	same
DEF-C0006-0280 _(2037904)	Steel Pony Truss	4	same
DEF-T0189-0040 _(2038196)	Steel Beam	4	same

## FINDINGS AND COMMENTS:

### General

Ohio State statutes establish requirements governing the safety inspection of all bridges within the State borders. ODOT with participation of FHWA has developed the ODOT publication Bridge Inspection Manual, hereafter referred to as the Manual, which establishes guidance and requirements regarding bridge inspections within the State. FHWA has determined that ODOT guidance meets or exceeds the FHWA NBIS requirements.

The federal regulations for administering the NBIS are located in the Code of Federal Regulations 23 Highways – Part 650 Subpart C - National Bridge Inspection Standards. The regulations can be found at the following web site:

<http://wwwcf.fhwa.dot.gov/legregs/directives/fapg/cfr0650c.htm>

Ohio currently rates bridge element conditions with a 1-4 scale. Summary items conform to the definitions and rating scales established by the NBIS. The NBIS do not require element level condition rating for County bridges unless they are on the expanded National Highway System (NHS) beginning October 1, 2014.

Defiance County has inspection responsibilities for 230 bridges, 110 of which are longer than 20 feet in length and 120 which are 10 feet to 20 feet long. The NBIS inspection and load rating requirements only pertain to highway bridges in excess of 20' long on public roads. Review of the inventory span lengths showed that all bridges had the NBIS designation Y/N coded correctly.

The office review and the field review demonstrated that County personnel were inspecting and coding bridges in accordance with ODOT's Bridge Inspection Manual ("Manual").

### **Inspection Procedures**

Defiance County uses their own staff to do the inspections. Previous inspection reports are available at site for review. The previous year's inspection reports on paper are brought out and changes are made on that form and transferred to AssetWise in the office. Bridge comments are recorded in the inspection form. Bridge plans are available in the office. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection.

The County indicated that an average of 7 inspections per day were completed in 2020. It takes about 30 minutes for Truss (pony/through/deck). It takes 15 minutes for Beam/Girders. For a slab, it takes about 12 minutes. For a Culvert, it takes about 6 minutes.

The County has 0 bridges that require a snooper.

A Team Leader is present at routine inspections.

### **Frequency of Inspections**

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Defiance County had 210 bridges inspected in 2020. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. The Engineer determines the need for a routine inspection frequency greater than once a year, based on inspections and history.

There are not any bridges that require inspections more frequently than one year.

### **Qualification and Duties of Personnel**

Mr. Warren Schlatter is the County Engineer and Program Manager. He is a PE and has over 23 years of bridge inspection experience. He took ODOT Level 1 bridge training in 1997 and has a Legacy Grandfather Clause checklist to document his experience prior to 2006. He took a Refresher in 2017. The Refresher and Legacy clause are approved and uploaded to AssetWise. He is qualified to be the Program Manager.

## Inspection Reports

As part of this review, six bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all six bridges properly reflected the field conditions within the tolerance of 1 rating value when compared to the Manual. Summary ratings correspond with the NBIS inspection items.

## Field Review

### DEF-T0189-0040 (2038196)

Deck = ..... 6  
Superstructure = ..... 7 could be 6  
Substructure = ..... 4  
Channel = ..... 7  
Scour = ..... 7  
Culvert = ..... N  
Photos = ..... need measurement to show how much footer is exposed  
Channel Photos = ..... Cross Sections  
Comments= ..... Notes for Substructure are required to be in AW. Need to add quantities and/or measurements

### DEF-C0150-0170 (2040123)

Deck = ..... 6  
Superstructure = ..... 4  
Substructure = ..... 5  
Channel = ..... 7  
Scour = ..... 7  
Culvert = ..... N  
Photos = ..... Good  
Channel Photos = ..... Cross Sections  
Comments= ..... need LES comments for Substructure and Super

**DEF-C0058-1116 (2043556)**

Deck = ..... N  
Superstructure = ..... N  
Substructure = ..... N  
Channel = ..... 6  
Scour = ..... 7  
Culvert = ..... 3  
Photos = ..... Good – should be updated to show current photos or add note that photo is still current  
Channel Photos = ..... Cross Sections  
Comments= ..... Good -

**DEF-T0042-0100 (2042525)**

Deck = ..... N  
Superstructure = ..... N  
Substructure = ..... N  
Channel = ..... 7  
Scour = ..... 6  
Culvert = ..... 4  
Photos = ..... GOOD  
Channel Photos = ..... Cross Sections  
Comments= ..... Good

Item 72 Appr Rdway Alignment should be code 8 not 6

**DEF-C0006-0280 (2037904)**

Deck = ..... 6  
Superstructure = ..... 4  
Substructure = ..... 7  
Channel = ..... 7  
Scour = ..... 7  
Culvert = ..... N  
Photos = ..... Good  
Channel Photos = ..... Cross Sections

Comments= .....Good

Scour item 113 should be code 5 not 8

### **DEF-C0067-0150 (2040271)**

Deck = ..... 6

Superstructure = ..... 5

Substructure = ..... 6

Channel = ..... 5

Scour = ..... 7

Culvert = ..... N

Photos = ..... Good

Channel Photos = ..... Cross Sections

Comments= ..... Need LES in Superstructure comments, such as 50% section loss to outer top flange of all fa  
beams

### **Inventory Items**

Review of the bridge data showed 3 out of 109 bridges had no comments when the rating was  $\leq 5$ , and review of the 6 bridges in the field showed 3 bridges where comments were incomplete, missing sufficient detail with LES described in AssetWise when the rating was 5 or lower. This requirement became effective Nov of 2020.

### **Files**

Defiance County keeps files as follows: (INS = Inspection Files, DES = Design files)

- • Inspection reports, including old inspections INS
- Design Calculations DES
- Plans DES
- Load analysis calculations INS
- Inventory forms INS
- Photos and sketches DES
- Repairs and maintenance history INS\DES
- Scour evaluation NA
- Scour POA NA
- Fracture Critical File INS
- Load Posting/Closing INS
- Underwater inspections NA
- Special inspection eqpt. or procedures INS
- Flood data, waterway adequacy, channel cross sections INS

## **Load Rating**

The inventory shows 110 (100.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are 4 NBIS bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 2038916, 2040123 and 2040271. The load posting at the bridge matched the load rating on all bridges. P.E. name and stamp were on all of the bridges. Documentation was on all of the bridges. BR100 form is available for all engineering judgment bridges.

## **Load Posting**

Defiance County has 3 NBIS bridges that are load posted. There is 1 bridge closed for condition ratings. Posting is based on Operating Rating. R12-H5 signs are the type of sign used for load posting.

## **Special Features**

There are 0 bridges with unique or special features.

## **Fracture Critical Bridges**

The FC bridge inspection frequency is 12 months, done with routine annual inspections. FC plans for SFN 2037904 were reviewed. The FCM's identified, **but the FC Inspection Procedure and Fatigue Prone details will not meet FHWA approval.** The county was advised they can use Inspection Manual **Appendix D & E** as guidelines to a complete FC plan.

Gusset Plate calculations were satisfactory for 2037904.

## **Underwater Inspections and Scour**

Defiance county does not have any bridges that require dive inspections.

## **QA/QC**

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. The Inventory items are checked and updated during annual inspections.

## **Critical Findings**

The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). The county engineer is the bridge inspector and develops the plans for emergency work.

## **Bridge Maintenance**

The County does contract bridge work. The typical work is for large bridges, replacements and repairs. The approximate annual budget is approximately \$500,000. Fed Funds are sometimes used for bridge deck replacement and Credit Bridge Funds are used for bridge replacements.

The county does force account bridge work and uses highway maintenance crews as needed. Typical work items include all repairs and medium replacements. The approximate budget is \$250,000.

The chart on the following page is a review of the 23 Metrics used to measure NBIS compliance and the chart represents a **preliminary, tentative** assessment of the county's level of compliance. Action steps for compliance are listed at the bottom. The actual assessments of NBIS compliance are made by FHWA, based on documentation, and any final determinations of compliance may differ from this preliminary assessment. The Metric 12 & 22 result on the following page is based on the field review of the six bridges visited during the QAR using the NBIP Field Review Checklist - PY 2013, Minimum Level Review Items.

## PRELIMINARY FHWA 23 Metric Matrix

23 metrics used by FHWA to measure NBIS compliance. Actual "score" by FHWA may differ.

### Compliance Codes for the following Metrics:

(C)	Compliant
(SC)	Substantially Compliant
(CC)	Conditionally Compliant
(NC)	Not Compliant

Metric	Description	(C)	(SC)	(CC)	(NC)
1	State Bridge Inspection Organization				
2	Program Manager Qualification				
3	Team Leader Qualification				
4	Load Rating Engineer Qualification				
5	UW Bridge Inspection Diver Qualification				
6	Routine Inspection Frequency - Low Risk				
7	Routine Inspection Frequency - High Risk				
8	UW Inspection Frequency - Low Risk				
9	UW Inspection Frequency - High Risk				
10	FC Inspection Frequency				
11	Frequency Criteria				
12	Inspection Quality **				
13	Load Rating				
14	Posted or Restricted Bridges				
15	Bridge Files				
16	FC Bridges				
17	UW inspection procedures				
18	Scour Critical Bridges				
19	Complex Bridges				
20	QC/QA				
21	Critical Findings				
22	Inventory **				
23	Updating of Data				

\*\* based on results of Field Review

Metric	Action Needed
12	improve comments
16	Supply FC Insp Procedure and Fatigue Prone details for each FC bridge